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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Peter Miguel Martino

Serial No.: 10/652,847

Filed: August 29, 2003

Confirmation No.: 2821

Group Art Unit: 2841

Examiner: Semenenko, Yuriy

Docket No. 200309657-1

For: Substrate Reinforcing In An LGA Package

CERTIFICATE OF FACSIMILE TRANSMISSION UNDER 37 CFR §1.8

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October 20, 2006  
Date

Ruta Reynolds  
Ruta Reynolds

AMENDED APPEAL BRIEF UNDER 37 C.F.R. §1.192 AND MPEP §1205.03

Mail Stop Appeal Brief - Patents:  
Commissioner of Patents and Trademarks  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This is an amended appeal brief in response to the Notice of Non-Compliant Appeal Brief (37 C.F.R. 41.37) mailed on September 27, 2006 (Part of Paper No. 20060925). This amended appeal brief corrects the claims appendix to list only those claims involved in the appeal, removes authorization to charge the previously submitted appeal brief fee in the Conclusion, and is submitted based on the decision of Examiner Yuriy Semenenko, Group Art

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Unit 2841, of May 18, 2006, (Part of Paper No./Mail Date 20060510), rejecting claims 1-10 and 16-20 in the present application and making the rejection FINAL.

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#### **I. REAL PARTY IN INTEREST**

The real party in interest of the instant application is Hewlett-Packard Development Company, a Texas Limited Liability Partnership, having its principal place of business in Houston, Texas.

#### **II. RELATED APPEALS AND INTERFERENCES**

There are no related appeals or interferences.

#### **III. STATUS OF THE CLAIMS**

Claims 1-10 and 16-20 are pending in the present application, with claims 11-15 withdrawn from consideration. Claims 1-10 and 16-20 were rejected by the FINAL Office Action and are the subject of this appeal.

#### **IV. STATUS OF AMENDMENTS**

No amendments have been made or requested since the mailing of the FINAL Office Action and all amendments submitted prior to the FINAL action have been entered. A copy of the currently pending claims is attached hereto as Appendix, section IX.

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## **V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

Embodiments of the claimed subject matter are illustrated in FIGs. 1-4 and are discussed in the specification at least at pages 4-7.

Embodiments of the claimed subject matter, such as those defined by claim 1, define an LGA package (see, *e.g.*, FIG. 1, reference numeral 100 and page 5, lines 5-24) comprising a substrate 102 (see, *e.g.*, FIG. 1, reference numeral 102 and page 5, lines 10-19); a die attached to an upper surface of the substrate (see, *e.g.*, FIG. 1, reference numeral 104 and page 5, lines 10-19); a lid attached to an upper surface of the die (see, *e.g.*, FIG. 1, reference numeral 106 and page 5, lines 10-19); and a substrate reinforcement member attached to the upper surface of the substrate and separated from the lid (see, *e.g.*, FIGs. 1 and 2, reference numeral 112 and page 6, lines 1-19).

Embodiments of the claimed subject matter, such as those defined by claim 2, further define the LGA package of claim 1, wherein the substrate reinforcement member comprises a ring attached to the upper surface of the substrate around the periphery of the lid (see, *e.g.*, FIG. 2, and page 6, lines 1-19).

Embodiments of the claimed subject matter, such as those defined by claim 3, further define the LGA package of claim 1, wherein the substrate reinforcement member comprises at least one longitudinal bar (see, *e.g.*, FIG. 3, reference numeral 302 and page 6, lines 1-19).

Embodiments of the claimed subject matter, such as those defined by claim 4, further define the LGA package of claim 1, wherein the substrate reinforcement member comprises one of Invar and SiC (see, *e.g.*, page 4, line 17 – page 5, line 4 and page 6, lines 13-19).

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Embodiments of the claimed subject matter, such as those defined by claim 5, further define the LGA package of claim 1, wherein the lid comprises one of AlSiC-9, CuW, and SiC (see, *e.g.*, page 4, lines 12 - 16 and page 5, lines 10-19).

Embodiments of the claimed subject matter, such as those defined by claim 6, further define the LGA package of claim 1, wherein a coefficient of thermal expansion of the substrate reinforcement member is substantially equal to a coefficient of thermal expansion of the substrate (see, *e.g.*, page 4, line 17 - page 5, line 4 and page 6, lines 13-19).

Embodiments of the claimed subject matter, such as those defined by claim 7, further define the LGA package of claim 1, wherein coefficients of thermal expansion of the substrate and the substrate reinforcement member are matched to reduce mechanical stress in the substrate and in an adhesive that attaches the lid to the upper surface of the die (see, *e.g.*, FIG. 1, reference numeral 110, and page 4, line 17 - page 5, line 4).

Embodiments of the claimed subject matter, such as those defined by claim 8, further define the LGA package of claim 1, wherein the substrate reinforcement member is parallel and adjacent to sides of the lid (see, *e.g.*, FIGs. 2-4 and page 6, lines 9-12 and lines 20-25, and page 7, lines 1-4).

Embodiments of the claimed subject matter, such as those defined by claim 9, further define the LGA package of claim 1, wherein the substrate reinforcement member comprises four separate bars (see, *e.g.*, FIG. 3 and page 6, lines 20-25).

Embodiments of the claimed subject matter, such as those defined by claim 10, further define the LGA package of claim 1, wherein the substrate reinforcement member has an elongated bar shape (see, *e.g.*, FIGs. 3-4 and page 6, line 20 - page 7, line 4).

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Embodiments of the claimed subject matter, such as those defined by claim 16, define an LGA package (see, *e.g.*, FIG. 1, reference numeral 100 and page 5, lines 5-24) comprising a substrate 102 (see, *e.g.*, FIG. 1, reference numeral 102 and page 5, lines 10-19); a die attached to a surface of the substrate (see, *e.g.*, FIG. 1, reference numeral 104 and page 5, lines 10-19); a lid attached to a surface of the die (see, *e.g.*, FIG. 1, reference numeral 106 and page 5, lines 10-19); and a substrate reinforcement member attached to a surface of the substrate and being adapted to reduce mechanical stress in the substrate (see, *e.g.*, FIGs. 1 and 2, reference numeral 112 and page 4, lines 1-20 and page 6, lines 1-19).

Embodiments of the claimed subject matter, such as those defined by claim 17, further define the LGA package of claim 16, wherein the substrate reinforcement member has a rectangular cross section (see, *e.g.*, FIGs. 1-2 and page 6, lines 1-8).

Embodiments of the claimed subject matter, such as those defined by claim 18, further define the LGA package of claim 16, wherein the lid is adapted to move downwardly to accommodate bending of the substrate (see, *e.g.*, page 4, line 17 – page 5, line 4).

Embodiments of the claimed subject matter, such as those defined by claim 19, further define the LGA package of claim 16, wherein the substrate reinforcement member extends around a periphery of the die (see, *e.g.*, FIG. 2, and page 6, lines 1-19).

Embodiments of the claimed subject matter, such as those defined by claim 20, further define the LGA package of claim 16, wherein the substrate reinforcement member comprises two separate members that are adjacent to and separate from the lid (see, *e.g.*, FIG. 1 and related description, and page 3, lines 6-8 and page 4, lines 1-16).

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## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

The FINAL Office Action rejected claims 1, 16, 18 and 19 under 35 U.S.C. § 103(a) as allegedly obvious over the combination of *Coffin et al.* ("Coffin," U.S. Pub. No. 2002/0079117) in view of *Kutlu* ("Kutlu," U.S. Pat. No. 6,472,762).

The FINAL Office Action rejected claims 2, 8 and 17 under 35 U.S.C. § 103(a) as allegedly obvious over the combination of *Coffin* in view of *Kutlu* and in view of *Baba* ("Baba," U.S. Pat. No. 6,313,521).

The FINAL Office Action rejected claims 3 and 10 under 35 U.S.C. § 103(a) as allegedly obvious over the combination of *Coffin* in view of *Kutlu* and in view of *McCutcheon* ("McCutcheon," U.S. Pat. No. 5,958,556).

The FINAL Office Action rejected claim 5 under 35 U.S.C. § 103(a) as allegedly obvious over the combination of *Coffin* in view of *Kutlu* and in view of *Toy et al.* ("Toy," U.S. Pat. No. 6,333,460).

The FINAL Office Action rejected claims 4, 6 and 7 under 35 U.S.C. § 103(a) as allegedly obvious over the combination of *Coffin* in view of *Kutlu* and in view of *Gungor et al.* ("Gungor," U.S. Pat. No. 5,944,097).

The FINAL Office Action rejected claims 9 and 20 under 35 U.S.C. § 103(a) as allegedly obvious over the combination of *Coffin* in view of *Kutlu* and in view of *Alcoe et al.* ("Alcoe," U.S. Pub. No. 2002/0135063).

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## **VII. ARGUMENT**

### **A. Discussion of Art-Based Rejections Under 35 U.S.C. § 103(a) – (Independent Claims 1 and 16 and Corresponding Dependent Claims 2-10 and 17-20)**

The FINAL Office Action has continued to reject claims 1-10 and 16-20 on identical bases as were set forth in the previous non-final Office Action mailed on December 7, 2005. Specifically, the FINAL Office Action has rejected claims 1-10 and 16-20 as allegedly unpatentable over the various combinations of references described in Section VI above. For at least the reasons set forth herein, Applicant respectfully disagrees with the rejections and requests that the rejections be overturned.

The FINAL Office Action asserted arguments allegedly in support of obviousness, with a representative sampling of these arguments provided below (emphasis added):

*"Kutlu* discloses a substrate reinforcement member 116, Fig. 4 attached to the upper surface of the substrate 106 and separated from the lid 104. At time the invention was made, it was well know to use a substrate reinforcement member attached to the upper surface of the substrate and separated from the lid.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention that a substrate reinforcement member attached to the upper surface of the substrate and separated from the lid.

Benefit of separating a substrate reinforcement member from the lid is eliminate of necessity to match the coefficient of thermal expansion (CTE).

*"Kutlu* discloses a substrate reinforcement member 116, Fig. 4 attached to a surface of the substrate 106 and being adapted to reduce mechanical stress in the substrate (column 2, lines 8-22). At time the invention was made, it was well know to use a substrate reinforcement member attached to the upper surface of the substrate and being adapted to reduce mechanical stress in the substrate.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention that a substrate reinforcement member attached to the upper surface of the substrate and being adapted to reduce mechanical stress in the substrate.

Benefit of doing so is to reduce mechanical stress in the substrate.



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"*Kutlu* discloses the lid 104 is adapted to move downwardly to accommodate bending of the substrate 106. [This is possible because the substrate reinforcement member attached to the surface of the substrate separated from the lid, Fig. 4]. At time the invention was made, it was well know to use the lid is adapted to move downwardly to accommodate bending of the substrate.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the lid is adapted to move downwardly to accommodate bending of the substrate.

Benefit of separating a substrate reinforcement member from the lid is eliminate of necessity to match the coefficient of thermal expansion (CTE).

"*Kutlu* discloses the substrate reinforcement member 116 extends around a periphery of the die 102, Fig. 4. At time the invention was made, it was well know to use the substrate reinforcement member extends around a periphery of the die.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention that the substrate reinforcement member extends around a periphery of the die to provide stiffness.

"*Baba* discloses in Fig. 3 the substrate reinforcement member comprises a ring 10. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member comprises a ring.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the substrate reinforcement member comprises a ring to provide stiffness.

"*Baba* discloses in Fig. 3 the substrate reinforcement member is parallel and adjacent to sides of the lid. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member is parallel and adjacent to sides of the lid.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the substrate reinforcement member is parallel and adjacent to sides of the lid to provide stiffness.

"*Baba* discloses in Fig. 3 the substrate reinforcement member has a rectangular cross section. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member has a rectangular cross section.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the substrate reinforcement member has a rectangular cross section to provide stiffness.

"*McCutcheon* discloses in Fig. 1 the substrate 8 reinforcement member comprises at least one longitudinal bar 2. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member comprises at least one longitudinal bar.

Therefore it would have been obvious to one of ordinary skill in the art, at time

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the invention was made, for Coffin to include in his invention the substrate reinforcement member comprises at least one longitudinal bar to provide stiffness.

"*McCutcheon* discloses in Fig. 1 the substrate reinforcement member has an elongated bar shape 2. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member has an elongated bar shape.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the substrate reinforcement member has an elongated bar shape to provide stiffness.

"*Toy* discloses also discloses in the "Background of the invention" section, at the time the invention was made, it was well know to use the lid comprises one of AlSiC-9, CuW, and SiC (column 2, lines 5-11).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the lid comprises one of AlSiC-9, CuW, and SiC to provide better matching of the coefficient of thermal expansion (CTE) chip and lid.

"*Gungor* discloses in Fig. 2 the substrate 16 reinforcement member 10 comprises one of Invar and SiC. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member comprises one of Invar and SiC.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the substrate reinforcement member comprises one of Invar and SiC, to provide stiffness.

"*Alcoe* discloses in Fig. 4 the substrate 10 reinforcement member comprises four separate bars 20. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member comprises four separate bars.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the substrate reinforcement member comprises four separate bars to provide stiffness.

"*Alcoe* discloses in Fig. 4 the substrate 10 reinforcement member comprises two separate members 20. Therefore, at time the invention was made, it was well know to use the substrate reinforcement member comprises two separate members.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made, for Coffin to include in his invention the substrate reinforcement member comprises two separate members to provide stiffness." ([sic])

Applicant respectfully submits that a *prima facie* case for obviousness has not been established. In particular, Applicant respectfully submits that the arguments presented in the

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FINAL Office Action (including the representative examples cited above) to allegedly support a finding of obviousness are inadequate as a matter of law to provide the required suggestion or motivation to combine selective teachings from multiple prior art references.

As has been acknowledged by the U.S. Court of Appeals for the Federal Circuit, the U.S. Patent and Trademark Office ("USPTO") has the burden under section 103 to establish a *prima facie* case of obviousness by showing some objective teaching in the prior art or generally available knowledge of one of ordinary skill in the art that would lead that individual to the claimed invention. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). The Manual of Patent Examining Procedure (MPEP) section 2143 discusses the requirements of a *prima facie* case for obviousness. That section provides as follows (emphasis added):

To establish a *prima facie* case of obviousness, three basic criteria must be met. *First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teaching.* Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and reasonable expectation of success must be found in the prior art, and not based on applicant's disclosure.

As indicated above, Applicant respectfully asserts that the reasoning presented in the FINAL Office Action to support the alleged motivation to combine the various art references is inadequate as a matter of law to provide the required suggestion or motivation to combine selective teachings from multiple prior art references, as required for a *prima facie* case for obviousness. In Applicant's response (dated February 28, 2006) to the non-final Office Action, the Applicant provided the below-cited case law to help provide further guidance on establishing a *prima facie* case for obviousness:

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"When the patented invention is made by combining known components to achieve a new system, the prior art must provide a suggestion or motivation to make such a combination." Heidelberger Druckmaschinen v. Hantscho Commercial Products, Inc., 21 F.3d 1068, 1072, 30 U.S.P.Q.2d 1377 (Fed. Cir. 1994).

"Virtually every invention is a combination of elements or process steps, and synergism, or its equivalent 'new and different result,' is not *required* for patentability." Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1549, 220 U.S.P.Q. 193 (Fed. Cir. 1983).

"Humans must work with old elements, most if not all of which win normally be found somewhere in an 'examination of the prior art.'" Connell v. Sears, Roebuck & Co., 722 F.2d 1542, 1549, 220 U.S.P.Q. 193 (Fed. Cir. 1983).

In view of the above citations of case law, it is clear that finding a missing feature in a secondary reference, even if known (the admission of which is neither implied nor expressed by this observation), does not provide the necessary motivation or suggestion to combine the secondary reference with the primary reference. Furthermore, the teaching, motivation, or suggestion to combine must be present within the cited references. In re Fine, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988).

The FINAL Office Action replied to the Applicant's assertions of improper motivation with the following statement on page 2, section 2.2 (no emphasis added):

However, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and In re Jones, 985 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). And further, there is no requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill on the art. In re McLaughlin, 170 USPQ 209 (CCPA 1971). In re Bozek, 163 USPQ 545 (CCPA) 1969.

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Applicant respectfully believes this rebuttal argument to be insufficient to overcome the above stated deficiencies of the FINAL Office Action. For instance, the lack of motivation is evidenced by the lack of proper support as to where in the cited art reference the asserted benefits are disclosed. For instance, in the arguments presented in section 3.1.1 on page 4 of the FINAL Office Action corresponding to claim 1, it is alleged that the benefit of “separating a substrate reinforcement member from the lid is eliminate of necessity to match the coefficient of thermal expansion.” ([sic]; emphasis added) However, no support in any of the cited references for this alleged benefit is provided in the FINAL Office Action.

As another representative example, in the arguments presented in section 3.1.2 on page 4 of the FINAL Office Action corresponding to claim 16, it is alleged that the benefit of including in *Coffin* that a “substrate reinforcement member attached to the upper surface of the substrate and being adapted” is “to reduce mechanical stress in the substrate.” ([sic]; emphasis added) Again, no support in any of the cited references for this alleged benefit is disclosed in the FINAL Office Action.

These examples are illustrative of the complete lack of support for the alleged benefit in all of the arguments presented in the FINAL Office Action. Thus, Applicant respectfully submits that the arguments presented in the FINAL Office Action to allegedly support a finding of obviousness are inadequate as a matter of law to provide the required suggestion or motivation to combine selective teachings from multiple prior art references. For at least the forgoing reasons, it is Applicant’s position that a *prima facie* for obviousness has not been made against Applicant’s claims, and thus the rejections to claims 1-10 and 16-20 should be overturned.

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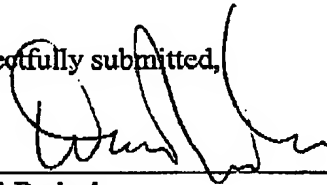
CONCLUSION

Based upon the foregoing discussion, Applicants respectfully request that the Examiner's final rejection of claims 1-10 and 16-20 be overturned by the Board, and that the application be allowed to issue as a patent with all pending claims 1-10 and 16-20.

In addition to the claims shown in the claims Appendix VIII, Appendix IX attached hereto indicates that there is no evidence being attached and relied upon by this brief. Appendix X attached hereto indicates that there are no related proceedings.

No additional fees are believed to be due in connection with this Appeal Brief. If, however, any additional fees are deemed to be payable, you are hereby authorized to charge any such fees to deposit account No. 08-2025.

Respectfully submitted,



David Rodack  
Reg. No.: 47,034

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### **VIII. CLAIMS - APPENDIX**

1. A land grid array (LGA) package for clamping to an interposer socket on a printed circuit board, the LGA package comprising:

a substrate;

a die attached to an upper surface of the substrate;

a lid attached to an upper surface of the die; and

a substrate reinforcement member attached to the upper surface of the substrate and separated from the lid.

2. The LGA package of claim 1, wherein the substrate reinforcement member comprises a ring attached to the upper surface of the substrate around the periphery of the lid.

3. The LGA package of claim 1, wherein the substrate reinforcement member comprises at least one longitudinal bar.

4. The LGA package of claim 1, wherein the substrate reinforcement member comprises one of Invar and SiC.

5. The LGA package of claim 1, wherein the lid comprises one of AlSiC-9, CuW, and SiC.

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6. The LGA package of claim 1, wherein a coefficient of thermal expansion of the substrate reinforcement member is substantially equal to a coefficient of thermal expansion of the substrate.

7. The LGA package of claim 1, wherein coefficients of thermal expansion of the substrate and the substrate reinforcement member are matched to reduce mechanical stress in the substrate and in an adhesive that attaches the lid to the upper surface of the die.

8. The LGA package of claim 1, wherein the substrate reinforcement member is parallel and adjacent to sides of the lid.

9. The LGA package of claim 1, wherein the substrate reinforcement member comprises four separate bars.

10. The LGA package of claim 1, wherein the substrate reinforcement member has an elongated bar shape.

16. A land grid array (LGA) package comprising:  
a substrate;  
a die attached to a surface of the substrate;  
a lid attached to a surface of the die; and  
a substrate reinforcement member attached to a surface of the substrate and being adapted to reduce mechanical stress in the substrate.



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17. The LGA package of claim 16, wherein the substrate reinforcement member has a rectangular cross section.

18. The LGA package of claim 16, wherein the lid is adapted to move downwardly to accommodate bending of the substrate.

19. The LGA package of claim 16, wherein the substrate reinforcement member extends around a periphery of the die.

20. The LGA package of claim 16, wherein the substrate reinforcement member comprises two separate members that are adjacent to and separate from the lid.

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**IX. EVIDENCE - APPENDIX**

(None)

A-4

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**X. RELATED PROCEEDINGS - APPENDIX**

(None)

A-5